

THIS OPINION WAS NOT WRITTEN FOR PUBLICATION

The opinion in support of the decision being entered today (1) was not written for publication in a law journal and (2) is not binding precedent of the Board.

Paper No. 22

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

Ex parte KOHJI NUMATA

Appeal No. 1997-4047
Application No. 08/309,508¹

HEARD: January 13, 2000

Before KRASS, BARRETT, and BARRY, Administrative Patent Judges.
BARRY, Administrative Patent Judge.

DECISION ON APPEAL

This is a decision on the appeal under 35 U.S.C. § 134 from the final rejection of claims 1-3. The appellant filed an amendment after final rejection on May 13, 1996, which was entered. We affirm-in-part.

¹ The application was filed on September 22, 1994.

Appeal No. 1997-4047

Application No. 08/309,508

BACKGROUND

The invention at issue in this appeal converts and reconverts color signals between two different color spaces in an environment where reconverted color signals are confined in their dynamic range. Input and output color signals are formatted in the same color space, viz., red-green-blue (RGB), and intermediate color signals are formatted in a different color space, viz., luminance-chrominance-red-chrominance-blue (YCrCb).

The invention first converts input signals in the RGB color space into intermediate signals in the YCrCb color space. Then, it compensates at least one of the intermediate color signals by replacing an out-of-range value therein with a nearest value that is in-range. Later, the compensated intermediate color signals are compressed, stored, read, decompressed, and reconverted into output color signals in the RGB color space. By compensating the intermediate color signals instead of the output color signals, the invention eliminates the prior art's time consuming steps of checking and possibly compensating output color signals within the reversion process.

Claim 1, which is representative for our purposes,
follows:

1. An apparatus for converting color signals
comprising:

means for converting color signals in a first
color space into corresponding color signals in a
second color space,

means for reconverting converted color signals
in said second color space into corresponding color
signals in said first color space, and

means for compensating at least one of said
converted color signals in said second color space
in order to confine each component of reconverted
color signals in said first color space in a dynamic
range allowable for said component.

Besides the appellant's admitted prior art (AAPA), the
references relied on in rejecting the claims follow:

Walowit	4,941,038	Jul. 10, 1990
---------	-----------	---------------

McColl et al. (McColl) "Compression of colour image data using
histogram analysis and clustering techniques", Electronics &
Communication Engineering Journal, March/April 1989, pp. 93-
100.

Claim 1 stands rejected under 35 U.S.C. § 103 as obvious
over McColl in view of Walowit. Claims 2 and 3 stand rejected
under § 103 as obvious over AAPA in view of Walowit. Rather

than repeat the arguments of the appellant or examiner in toto, we refer the reader to the briefs and answers for the respective details thereof.

OPINION

In reaching our decision in this appeal, we considered the subject matter on appeal and the rejections and evidence advanced by the examiner. Furthermore, we duly considered the arguments of the appellant and examiner. After considering the totality of the record, we are not persuaded that the examiner erred in rejecting claim 1. We are persuaded, however, that he erred in rejecting claims 2 and 3. Accordingly, we affirm-in-part.

We begin by finding that the references represent the level of ordinary skill in the art. See In re GPAC Inc., 57 F.3d 1573, 1579, 35 USPQ2d 1116, 1121 (Fed. Cir. 1995) (finding that the Board of Patent Appeals and Interference did not err in concluding that the level of ordinary skill in the art was best determined by the references of record); In re

Oelrich, 579 F.2d 86, 91, 198 USPQ 210, 214 (CCPA 1978)
("[T]he PTO usually must evaluate ... the level of ordinary skill solely on the cold words of the literature."). Of course, every patent application and reference relies on the knowledge of persons skilled in the art to complement its disclosure. In re Bode, 550 F.2d 656, 660, 193 USPQ 12, 16 (CCPA 1977). Such persons must be presumed to know something about the art apart from what the references teach. In re Jacoby, 309 F.2d 513, 516, 135 USPQ 317, 319 (CCPA 1962).

We also note the following principles from In re Rijckaert, 9 F.3d 1531, 1532, 28 USPQ2d 1955, 1956 (Fed. Cir. 1993).

In rejecting claims under 35 U.S.C. Section 103, the examiner bears the initial burden of presenting a prima facie case of obviousness. In re Oetiker, 977 F.2d 1443, 1445, 24 USPQ2d 1443, 1444 (Fed. Cir. 1992). Only if that burden is met, does the burden of coming forward with evidence or argument shift to the applicant. Id. "A prima facie case of obviousness is established when the teachings from the prior art itself would appear to have suggested the claimed subject matter to a person of ordinary skill in the art." In re Bell, 991 F.2d 781, 782, 26 USPQ2d 1529, 1531 (Fed. Cir. 1993) (quoting In re Rinehart, 531 F.2d 1048, 1051, 189 USPQ 143, 147 (CCPA 1976)). If the examiner fails to establish a prima facie case, the rejection is improper and will

be overturned. In re Fine, 837 F.2d 1071, 1074, 5 USPQ2d 1596, 1598 (Fed. Cir. 1988).

With these in mind, we analyze the appellant's arguments.

Regarding claim 1, the appellant argues, "an artisan would not have combined, without the benefit of hindsight gleaned from Appellant's invention, the complex compensation procedure of Walowit, which considers a gamut mismatch between input and output color signals, with the Article's device, which has the inefficient compensating procedure but not the gamut mismatch." (Appeal Br. at 7.) He adds, "the McColl device does not experience the type of gamut mismatch between input and output colors that the Walowit device experiences to require the type of gamut mismatch processing that is performed in the Walowit device." (Reply Br. at 2.) The examiner replies, "It would have been obvious ... to add the 'means for compensating at least one of said converted color signals' of Walowit to the 'apparatus for converting color signals' of Colour Image Data for the desirable purpose of reducing conversion errors." (Examiner's Answer at 6.) He adds, "It is not clear how one color value being outside one

color gamut is a different type of mismatch than another color value being outside another color gamut." (Supplemental Examiner's Answer at 1.)

The appellant errs in considering the references individually. "Non-obviousness cannot be established by attacking references individually where the rejection is based upon the teachings of a combination of references." In re Merck & Co., 800 F.2d 1091, 1097, 231 USPQ 375, 380 (Fed. Cir. 1986) (citing In re Keller, 642 F.2d 413, 425, 208 USPQ 871, 881 (CCPA 1981)). In determining obviousness, furthermore, a reference "must be read, not in isolation, but for what it fairly teaches in combination with the prior art as a whole." Id., 231 USPQ at 380.

Here, the rejection is based on the combination of McColl and Walowit. The appellant admits that in McColl, the primary reference, "the input and output color signals ... are of the same color space." (Appeal Br. at 5.) More specifically, the primary reference discloses that "[t]he input and output data are ... (RGB) vectors" P. 96. The appellant also admits

that McColl "teach[es] means for converting primary color signals into secondary color signals and means for reconvert[ing] the secondary color signals back to primary color signals." (Paper No. 9 at 4.) More specifically, the primary reference shows converting (RGB) vectors into ($Y > 0$) vectors and reconvert[ing] the ($Y > 0$) vectors back into (RGB) vectors. Fig. 4. These disclosures teach (or would have suggested) the claimed "means for converting color signals in a first color space into corresponding color signals in a second color space," and the claimed "means for reconvert[ing] converted color signals in said second color space into corresponding color signals in said first color space"

The primary reference teaches even more. McColl discloses, "some ($Y > 0$) vectors may be forced to lie outside the bounds of RGB colour space [w]here necessary, codewords are reassigned to the nearest neighbour in the chromaticity alphabet so that the ($Y > 0$) vector is known to lie within the bounds of the RGB colour space." P. 96. In summary, the primary reference compensates converted ($Y > 0$)

signals to confine each component of reconverted (*RGB*) in a dynamic range allowable for the component. This disclosure teaches or would have suggested the claimed "means for compensating at least one of said converted color signals in said second color space in order to confine each component of reconverted color signals in said first color space in a dynamic range allowable for said component."

For the foregoing reasons, we are not persuaded that the teachings of the combinations of references in combination with the prior art as a whole would not have suggested the claimed limitation. The examiner has established a prima facie case of obviousness. Therefore, we affirm the rejection of claim 1 under 35 U.S.C. § 103.

Regarding claims 2 and 3, the appellant notes that the claims add "the features of compression and decompression means. These features, as illustrated in Fig. 2, are implemented after the intermediate color signals of the second color space ... are compensated." (Appeal Br. at 8.) He argues, "in Walowit compensation occurs after the

compression, which is contrary" to the claims. (Appeal Br. at 9.) The examiner replies that he "does not agree that the portions of Walowit cited by appellant requires the compensation step be performed after the compression/decompression steps. The cited portions say only that the compensation is performed in the intermediate color space ... to match the input and output color gamuts." (Examiner's Answer at 11.) We agree with the appellant.

The examiner errs in interpreting the scope of the claims. Claim 2 specifies in pertinent part the following limitations:

means for subjecting converted Y,Cr,Cb color signals to data compression,

means for subjecting compressed Y,Cr,Cb color signals to data decompression ...,

...

means for compensating at least one of said converted Y,Cr,Cb color signals

Similarly, claim 3 specifies in pertinent part the following limitations:

means for subjecting converted Y,Cr,Cb color signals to data compression,

means for subjecting compressed Y,Cr,Cb color signals to data decompression ...,

...

means for compensating Y component of converted Y,Cr,Cb color signals

The limitations evidence that "compressed Y,Cr,Cb color signals" are signals that have been compressed while "converted Y,Cr,Cb color signals" are signals that have not yet been compressed.

In view of this nomenclature, the compensating means of claims 2 and 3, which operate on "converted Y,Cr,Cb color signals" must be interpreted as compensating signals that have not yet been compressed.² By his own admission, the examiner fails to show a teaching or suggestion of these limitations in the prior art.

Further regarding claim 3, the appellant argues, "Walowitz fails to teach ... that compensation is performed specifically

²Such an interpretation accords with Figure 2 of the appellant's specification, which shows compensation occurring before compression.

on the Y component of Y, Cr, Cb color signals." (Reply Br. at 7.) The examiner replies, "Walowit does disclose at column 10, lines 12-16 and lines 24-26 that two chromatic components may be adjusted and may include Y as one of those components." (Examiner's Answer at 12.) We agree with the appellant.

Claim 3 specifies in pertinent part the following limitation: "compensating Y component of converted Y,Cr,Cb color signals" Persons skilled in the art would have known that in the YCrCb color space, picture data are "made up of a luminance signal component Y and chrominance signal components Cr and Cb." U.S. Patent No. 5,126,857, col. 1, ll. 46-48

(June 30, 1992). Such persons also would have known that the luminance signal component, Y, is a monochrome signal, Milton S. Kiver et al., Television Electronics: Theory and Servicing 77 (8th ed. 1983); i.e., the component is achromatic. In view of this knowledge, the limitation requires changing the luminance signal component Y of converted YCrCb color signals.

The examiner errs in determining the content of the prior art. Walowit includes the following teaching about compensation.

In one embodiment, an irreproducible color is brought to the edge of the gamut by determining the shortest vector distance from the color to the gamut. In another embodiment, the achromatic component is preserved as nearly as possible and only the chromatic components are adjusted to bring the color to the gamut in such a way that hue constancy is nearly preserved. In yet another embodiment, the colors are not clipped. Rather, all colors are compressed such that the range of input colors just fits within the range of output colors. This compression can also be done selectively and non-linearly, [sic] such that for every quantized achromatic level and hue level, the chromatic component is compressed to fit within the output range possible for the chromatic and achromatic levels while preserving hue as nearly as possible. Similar compressions can be performed as a function of saturation, lightness, hue or any other color metric. Col. 10, ll. 12-26.

In summary, the reference teaches changing the level of chromatic components while maintaining an achromatic component at a constant level. Because Walowit teaches the latter, the reference neither teaches nor would have suggested changing the value of the claimed component Y, which is achromatic. AAPA does not cure this deficiency.

For the foregoing reasons, we are not persuaded that the prior art would have suggested either the "means for compensating at least one of said converted Y,Cr,Cb color signals" of claim 2 or the "means for compensating Y component of converted Y,Cr,Cb color signals" of claim 3. The examiner has not established a prima facie case of obviousness. Therefore, we reverse the rejection of claims 2 and 3 under 35 U.S.C. § 103.

CONCLUSION

To summarize, the examiner's rejection of claim 1 under 35 U.S.C. § 103 is affirmed. His rejection of claims 2 and 3 under 35 U.S.C. § 103 is reversed. Accordingly, we affirm-in-part.

No period for taking subsequent action concerning this
appeal may be extended under 37 C.F.R. § 1.136(a).

AFFIRMED-IN-PART

ERROL A. KRASS)	
Administrative Patent Judge)	
)	
)	
)	
)	BOARD OF PATENT
LEE E. BARRETT)	APPEALS
Administrative Patent Judge)	AND
)	INTERFERENCES
)	
)	
)	
LANCE LEONARD BARRY)	
Administrative Patent Judge)	

LLB/kis

SUGHRUE, MION, ZINN, MACPEAK & SEAS
2100 PENNSYLVANIA AVENUE, NW
WASHINGTON, DC 20037